



# Technical Manual

## NON-SWITCHING DC SERVO STEREO INTEGRATED AMPLIFIER **RA-700**

### TABLE OF CONTENTS

Alignment . . . . .	2
Addenda . . . . .	3
Specifications . . . . .	3
Parts List. . . . .	4
Chassis Layout . . . . .	5
P-c Board Diagrams . . . . .	6
Schematic Diagram . . . . .	9

### TABLE DES MATIERES

Alignement . . . . .	2
Addenda . . . . .	3
Caractéristiques . . . . .	3
Liste des pièces . . . . .	4
Installation du châssis . . . . .	5
Diagrammes des plaquettes de circuits imprimés . . . . .	6
Diagramme schématique . . . . .	9

Serial No. Beginning  
**NE16311**

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# Alignment

**Instruments:** Oscilloscope, DC millivoltmeter

## POWER AMP SECTION

### A. DC Balance Adjustment

- Set vertical gain control of the oscilloscope to 0.1V/cm, and vertical input switch to GND. Bring the trace to central position on the screen; then set the vertical input switch to DC position.

Before making adjustment, short-circuit pin E6 to pin TP3 (TP4 for R-ch) on H-AF-119 p-c board, to avoid servo effect. (Fig. 1)

- Connect the oscilloscope to pin TP3 (TP4 for R-ch) on main amp p-c board. Set volume control of the amplifier to minimum position. Turn on the power. When DC output appears on the screen (the trace will shift upwards or downwards as shown in Fig. 1), adjust potentiometer VR401 (VR402 for R-ch) on H-AF-119 p-c board so that the DC voltage present at the test point is  $0\text{V}\pm 50\text{mV}$ .

After completing adjustment, disconnect the ground connection of TP terminal.

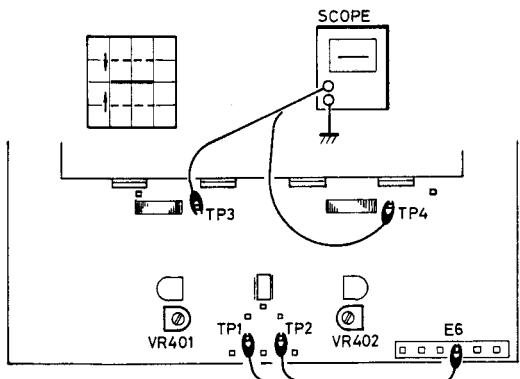


Fig. 1

### B. Bias (Idling Current) Adjustment

- Connect the plus lead of DC millivoltmeter to TP5 (TP6 for R-ch) on H-AF-119 and the minus lead to TP3 (TP4 for R-ch). Set volume control to minimum position. Turn on the power.
- Adjust potentiometer VR403 (VR404 for R-ch) on H-AF-119 p-c board so that the DC millivoltmeter reads 10mV.

## PHONO SECTION

### DC Balance Adjustment

- Set vertical gain control of the oscilloscope to 0.1V/cm, and vertical input switch to GND. Bring the trace to central position on the screen; then set the vertical input switch to DC.

Before making adjustment short-circuit pin 1 (pin 2 for R-ch) to pin E on PR-123 p-c board, to avoid servo effect. (Fig. 3)

- Connect the oscilloscope to pin 3 (pin 4 for R-ch) and pin E. Set Function Selector to PHONO (MC) position and volume control to minimum. Turn on the power.

When DC output appears on the screen (the trace will shift upwards or downwards as shown in Fig. 3), adjust potentiometer VR101 (VR102 for R-ch) on PR-123 p-c board so that the DC voltage present at

# Alignement

**Instruments:** Oscilloscope, millivoltmètre CC

## SECTION AMPLI DE PUISSANCE

### A. Réglage d'équilibrage CC

- Régler la commande de gain vertical de l'oscilloscope sur 0,1 V/cm et la commande d'entrée verticale sur GND. Amener la trace en position centrale sur l'écran; amener ensuite la commande d'entrée verticale sur la position CC. Avant d'effectuer ce réglage, court-circuiter la broche E6 et la broche TP3 (TP4 pour le canal de droite) sur la plaquette de circuit imprimé H-AF-119 afin d'éviter l'effet de rétroaction (Fig. 1).
- Brancher l'oscilloscope sur la broche TP3 (TP4 pour le canal de droite) sur la plaquette du circuit d'amplification principal. Régler la commande de volume de l'ampli sur la position minimum. Mettre sous tension. Lorsque la sortie CC apparaît sur l'écran (la trace est décalée vers le haut ou vers le bas comme illustré sur la Fig. 1), ajuster le potentiomètre VR401 (VR402 pour le canal de droite) sur la plaquette H-AF-119 de façon à ce que la tension CC observée sur le point de mesure soit de  $0\text{V}\pm 50\text{mV}$ . Une fois le réglage terminé, débrancher le circuit de mise à la masse de la borne TP.

### B. Réglage de polarisation (courant déwatté)

- Brancher le fil plus du millivoltmètre CC sur la broche TP5 (TP6 pour le canal de droite) de H-AF-119 et le fil moins sur TP3 (TP4 pour le canal de droite). Régler le volume au minimum. Mettre sous tension.
- Ajuster le potentiomètre VR403 (VR404 pour le canal de droite) sur la plaquette H-AF-119 de façon à ce que le millivoltmètre affiche 10 mV.

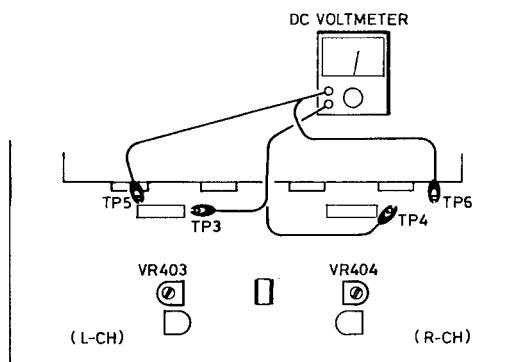


Fig. 2

## SECTION PHONO

### A. Réglage d'équilibrage CC

- Régler la commande de gain vertical de l'oscilloscope sur 0,1 V/cm et la commande d'entrée verticale sur GND. Amener la trace en position centrale sur l'écran puis régler la commande d'entrée verticale sur CC. Avant d'effectuer ce réglage, court-circuiter la broche 1 (broche 2 pour le canal de droite) et la broche E sur la plaquette PR-123 afin d'éviter l'effet de rétroaction (Fig. 3).
- Brancher l'oscilloscope sur la broche 3 (broche 4 pour le canal de droite) et la broche E. Amener le sélecteur de fonction sur la position PHONO (MC) et la commande de volume au minimum. Mettre sous tension. Lorsque la sortie CC apparaît sur l'écran (la trace est décalée vers le haut ou vers le bas comme illustré sur la Fig. 3), ajuster le potentiomètre VR101 (VR102



# Parts List

# Liste des pièces

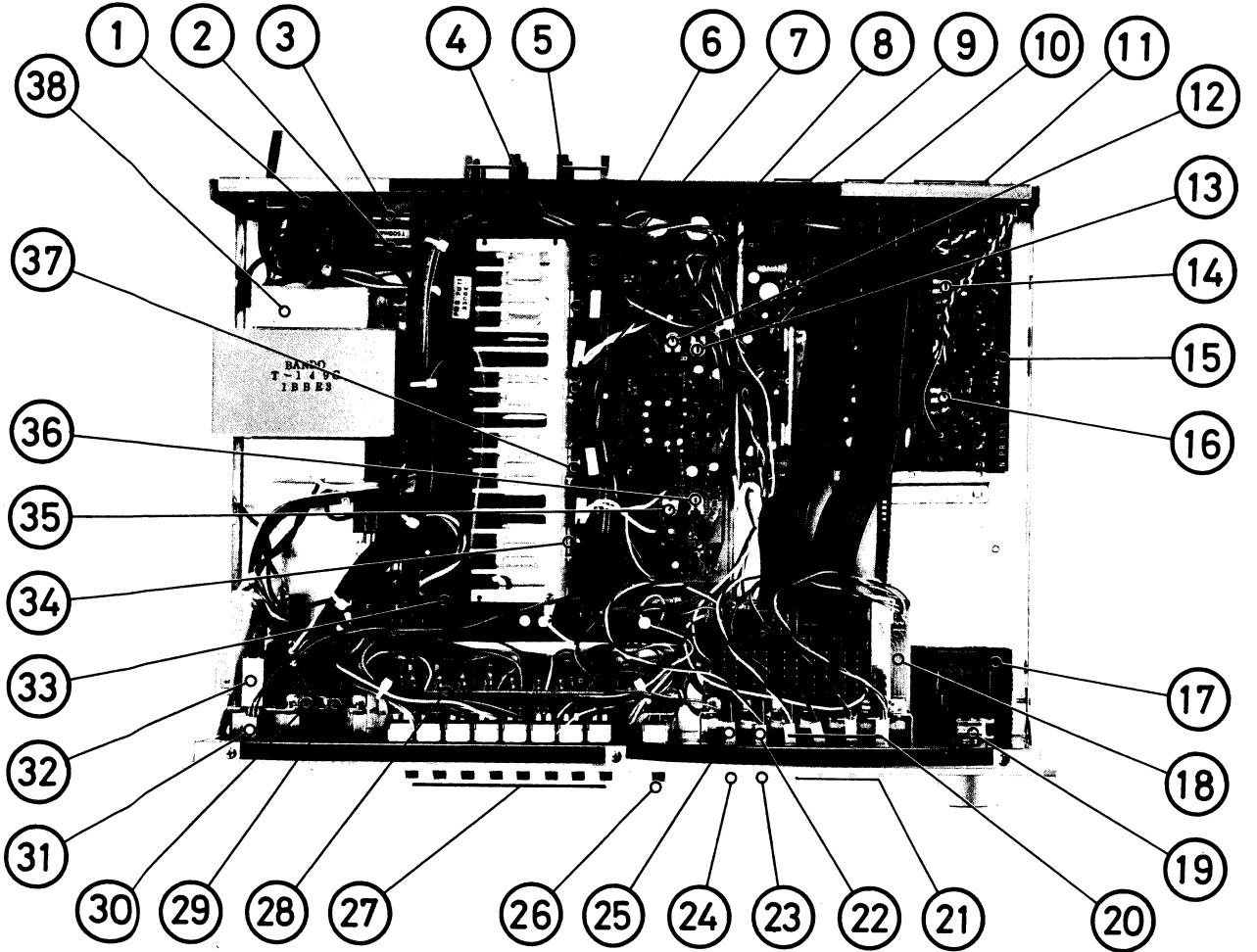
Schematic Location	Description	Part No.	Schematic Location	Description	Part No.
<b>TRANSISTORS, DIODES AND IC'S</b>					
Q101, 102, 111, 112, 186, 249, 250, 253, 254, 257, 258, 261, 262, 265, 266, 269, 270, 273, 274, 277, 278, 401, 402, 413, 414, 512	2SA608KNP (F, G)	301001193	VR401, 402	300B, Pot, Main DC Bal Adj	510502187
Q103 to 106 241 to 244 403 to 406	2SC1570 (G, H)	301201242	VR403, 404	10KB, Pot, Bias Adj	510502186
Q107 to 110 201, 202, 407, 408, 409, 410	2SK163 (K)	302001134	<b>OTHERS</b>		
Q113, 114, 119, 120, 245, 246, 415, 416, 421, 422, 441, 442	2SA1016 (G, H)	301001194	L401, 402	Coil, Antiparasitic	228641126
Q115 to 118 247, 248, 419, 420, 429, 430, 431, 432, 443 513,	2SC2362 (G, H)	301201241	T001	Power Transformer, "Type G"	207001528
Q121, 122, 433, 434	2SD600 (E, F)	301301150	RY511	Power Transformer, "Type D"	204001528
Q123, 124, 435, 436	2SB631 (E, F)	301101134	S101	Relay, Protection	240111251
Q181, 184	2SK246 (GR)	302001132	S1 to 3 (1 Set)	Switch, Remote, Phono MC/MM	615212298
Q182	2SC1984 (O, Y)	301201170	S4 to 7 (1 Set)	Switch, Push 6-key, Func Selector, etc.	614051217
Q183, 251, 252, 255, 256, 259, 260, 263, 264, 267, 268, 271, 272, 275, 276, 279, 280, 411, 412, 417, 418, 511, 514, 515	2SC536KNP (F, G)	301201236	S8, 9 (1 Set)	Switch, Push 4-key, Loudness, Mode, etc.	614040841
Q185	2SA919 (F, G)	301001192	S10	Switch, Push 2-key, Speakers	614020451
Q187	2SA913 (Q, R)	301001143	F531* <sup>1</sup>	Switch, Push 1-key, Power	614010165
Q423, 424, 427, 428	2SA1019 (E, F)	301001195	F532, 533	Fuse, 3.5A, (Pri), for 120V Area	341222350
Q425, 426,	2SC2375 (E, F)	301201243	F534, 535	Fuse, 5A, (Sec), for 120V Area	341222500
Q437, 438	2SC2578 (Q, Y)	301201235	C551	Fuse, T5A, (Sec), for 220/240V Area	345952500
Q439, 440	2SA1103 (Q, Y)	301001190		Fuse, 1A, (Sec), for 120V Area	341222100
D101 to 110 401 to 406 409 to 424 511	MA150 (Si)	300111016		Fuse, T500mA, (Sec), for 220/240V Area	345952050
D111, 112	KB-269, Varistor	300212004		Noise Canceller, NSK-135, for 120V Area	470101118
D181 to 183	WZ-140, Zener, 14V, 0.5W	300313018		PME265MB522, for 220/240V Area	470101136
D407, 408	SV-04S, Varistor	300212010		Preamplifier & Graphic & EQ P-c Board Ass'y	141510184
D531	RB-602, Rectifier	300919047		Main Amplifier & Power Supply	
D532	KBP-02, Rectifier	300919027		P-c Board Ass'y	141610351
D533	SR1K4, Rectifier	300919024		Pin Jack, 6P, Phono, Tuner, AUX Input	624302206
D534	WZ-120, Zener, 12V, 0.5W	300313013		Pin Jack, 4P, Tape In/Out	624303204
D001, 006, 007	GL-9PR24, LED, (RED), Power, Tape, Ind.	300414048		Speaker Terminal Board	649201123
D002 to 005	GL-9NG24, LED, (GRN), Func, Ind	300414049		Phone Jack	626110037
IC101, 401	NJM4558D	303452215		Voltage Selector	648211247
<b>VARIABLE RESISTORS</b>					
VR101, 102	100B, Pot, Phono DC Bal Adj	510502208		Fuse Clip, φ6.35	648211257
VR201	100kB x 2, Volume Control	525121152		Fuse Clip, φ5.2	648211256
VR202	250KW x 2, Balance Control	581005059		LED Socket w/Wire (RED/BLK), L=200mm	648211284
VR361 to 368	100KW x 2, Acoustic Control	581005058		LED Socket w/Wire (ORG/BLK), L=200mm	648211285
				LED Socket w/Wire (YLW/BLK), L=200mm	648211286
				LED Socket w/Wire (GRN/BLK), L=200mm	648211287
				LED Socket w/Wire (BLU/BLK), L=200mm	648211288
				LED Socket w/Wire (PPL/BLK), L=200mm	648211289
				LED Socket w/Wire (BRN/BLK), L=300mm	648211292
				Flex Wire Ass'y	647110017
				Power Cord, for U.S.A., etc.	796301115
				Power Cord, for Europe	796301148
				Power Cord, for UK	796301138
				Cord Stopper, U.S.A., Europe, etc.	675201114
				Cord Stopper, UK	675201116
				Cover, Power SW	792011219
				Cover, Noise Canceller* <sup>2</sup>	792011220
				Cover, Voltage Selector	792011218
				Front Panel Ass'y	111911572
				Top Cover	138011324
				Knob, Volume	116310351
				Knob, Balance, etc.	116310310
				Button, Loudness, Mode, etc.	116210104
				Button, Func, Power, etc.	116210092

\*1: Not used on the unit for 220/240V area.  
\*2: Not used on the unit for 120V area.

(A) SPEAKER TERM.

Schematic Location	Description	Part No.
Foot	Screw, M3 x 6 (Ni) Bind	673402027
Screw, M3 x 12 (Ni), Bind	Screw, M3 x 12 (Ni), Bind	705213006
Screw, M3 x 4 (Ni), Bind	Screw, M3 x 4 (Ni), Bind	705213012
Screw, M3 x 8 (BLZ), Bind	Screw, M3 x 8 (BLZ), Bind	705213004
Screw, M3 x 6 (Ni), Ovalcountersunk	Screw, M3 x 6 (Ni), Ovalcountersunk	702213006
Screw, M4 x 8 (BLZ) w/FW, Bind	Screw, M4 x 8 (BLZ) w/FW, Bind	755224008
Screw, TP3 x 10 (Ni)	Screw, TP3 x 10 (Ni)	726213010
Screw, TP3 x 8 (Ni)	Screw, TP3 x 8 (Ni)	726213008
Screw, TP3 x 10 (BLZ)	Screw, TP3 x 10 (BLZ)	726223010
Screw, TP3 x 8 (BLZ)	Screw, TP3 x 8 (BLZ)	726223008
Screw, TP3 x 8 (Ni), Ovalcountersunk	Screw, TP3 x 8 (Ni), Ovalcountersunk	722213006

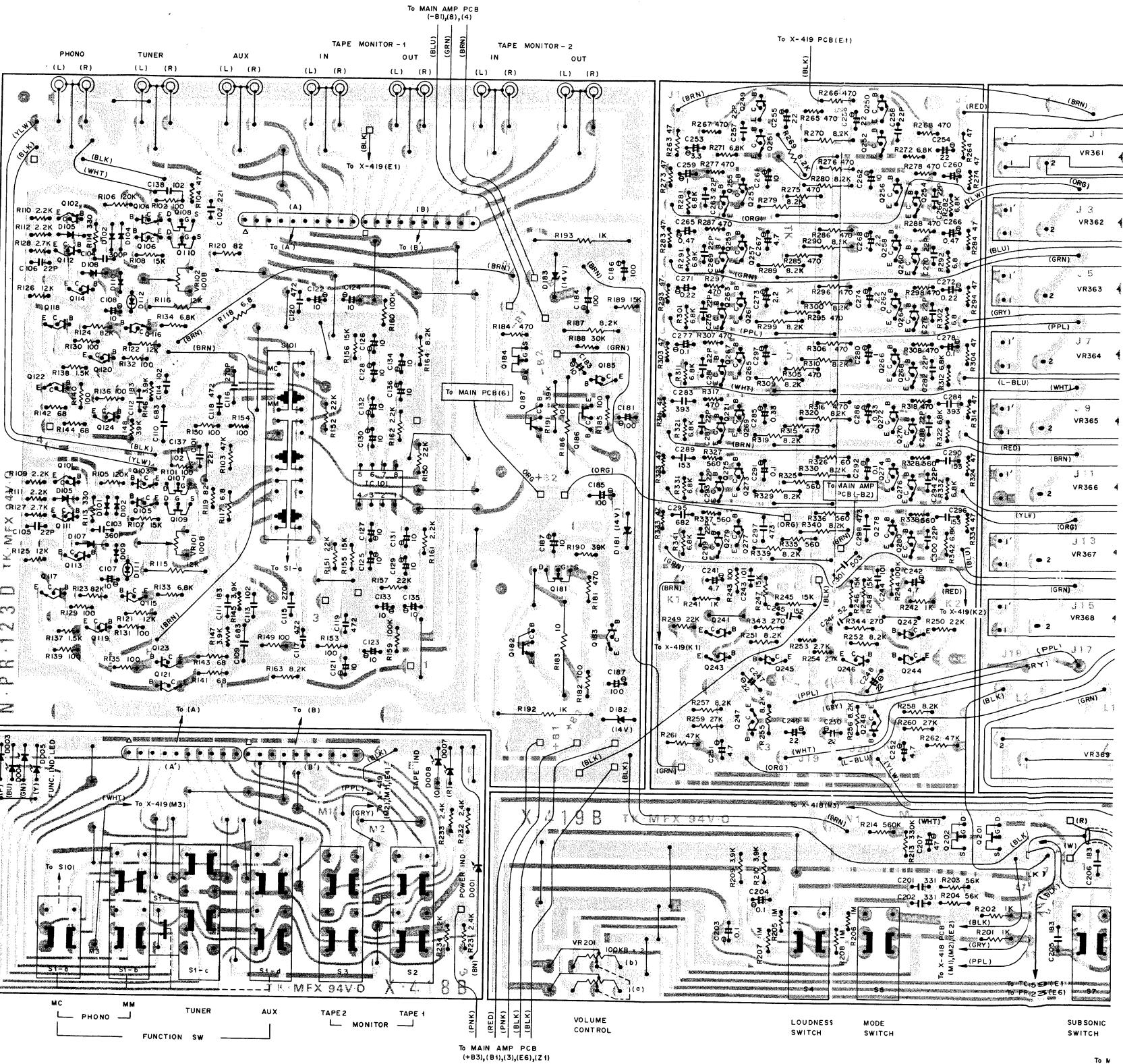
Chassis Layout (Top View) Installation du châssis (vue de dessus)



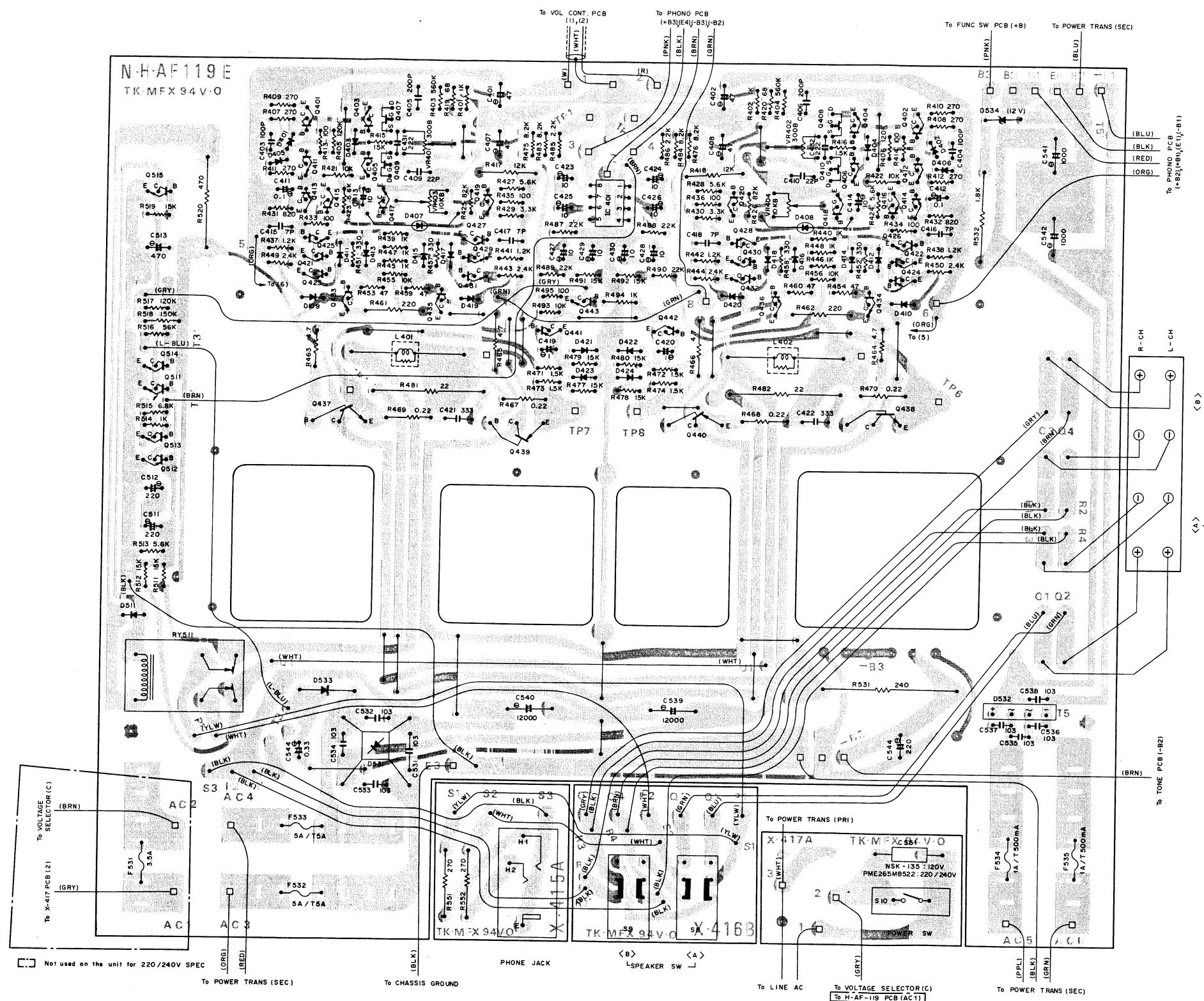
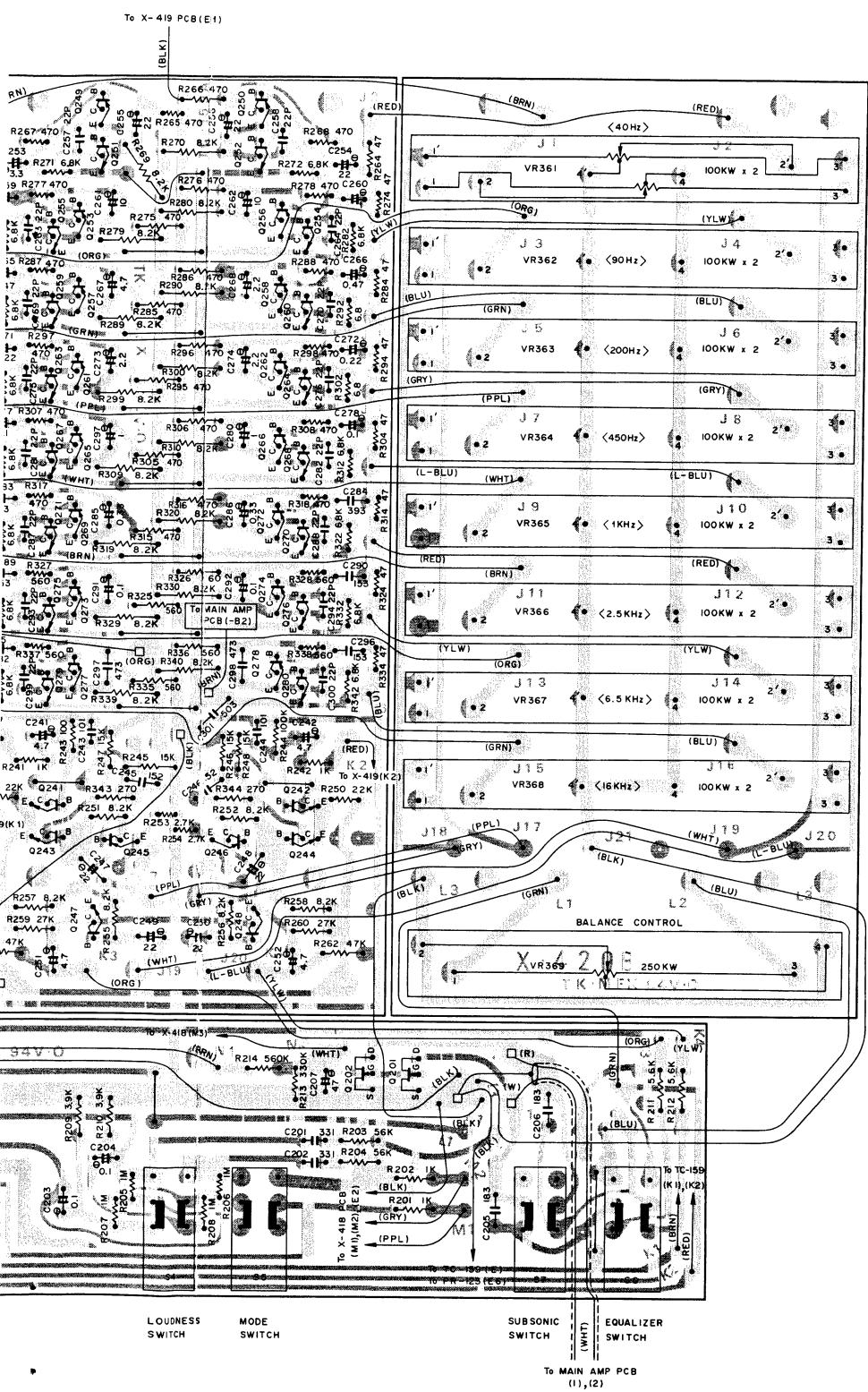
- 1. VOLTAGE SELECTOR
- 2. F534, FUSE
- 3. F535, FUSE
- 4. SPEAKER 'A' TERMINALS
- 5. SPEAKER 'B' TERMINALS
- 6. MAIN AMP AND POWER SUPPLY P-C BOARD
- 7. Q438, R-CH POWER TRANSISTOR
- 8. Q440, R-CH POWER TRANSISTOR
- 9. TAPE MONITOR-2 JACKS
- 10. TAPE MONITOR-1 JACKS
- 11. INPUTS JACKS
- 12. VR404, R-CH IDLING (BIAS) CURRENT ADJ
- 13. VR402, R-CH MAIN AMP OFF-SET (DC BALANCE) ADJ
- 14. VR102, R-CH PHONO AMP OFF-SET (DC BALANCE) ADJ
- 15. PHONO AMP P-C BOARD
- 16. VR101, L-CH PHONO AMP OFF-SET (DC BALANCE) ADJ
- 17. VOLUME CONTROL AND MUTING P-C BOARD
- 18. FUNCTION SELECTOR P-C BOARD
- 19. VOLUME CONTROL
- 20. FUNCTION INDICATOR
- 21. FUNCTION SELECTOR
- 22. TAPE-2 INDICATOR
- 23. TAPE-2 SWITCH
- 24. TAPE-1 SWITCH
- 25. TAPE-1 INDICATOR
- 26. BALANCE CONTROL
- 27. ACOUSTIC CONTROLS
- 28. EQUALIZER P-C BOARD
- 29. SPEAKER 'B' SWITCH
- 30. SPEAKER 'A' SWITCH
- 31. POWER INDICATOR
- 32. POWER SWITCH
- 33. PROTECTION RELAY
- 34. Q437, L-CH POWER TRANSISTOR
- 35. VR403, L-CH IDLING (BIAS) CURRENT ADJ
- 36. VR401, L-CH OFF-SET (DC BALANCE) ADJ
- 37. Q439, L-CH POWER TRANSISTOR
- 38. T001, POWER TRANSFORMER

Schematic Location	Description	Part No.
Screw, Tap-tight 4 x 10	Screw, Tap-tight 4 x 10	765214010
Washer, Plain M3	Washer, Plain M3	770500003
Washer, Spring M3	Washer, Spring M3	770500010
Washer, Spring M4	Washer, Spring M4	770500011
Washer, Plain M7	Washer, Plain M7	770500006
Nut, M3, Square, Tr Mtg.	Nut, M3, Square, Tr Mtg.	770911144
Nut, M4, Hex	Nut, M4, Hex	770402202
Nut, M7, Hex	Nut, M7, Hex	770402205
Stopper, Phone Jack	Stopper, Phone Jack	770911278
Spacer, M3, L=8mm	Spacer, M3, L=8mm	770911301
Insulation Collar, Tr Mtg.	Insulation Collar, Tr Mtg.	992001111

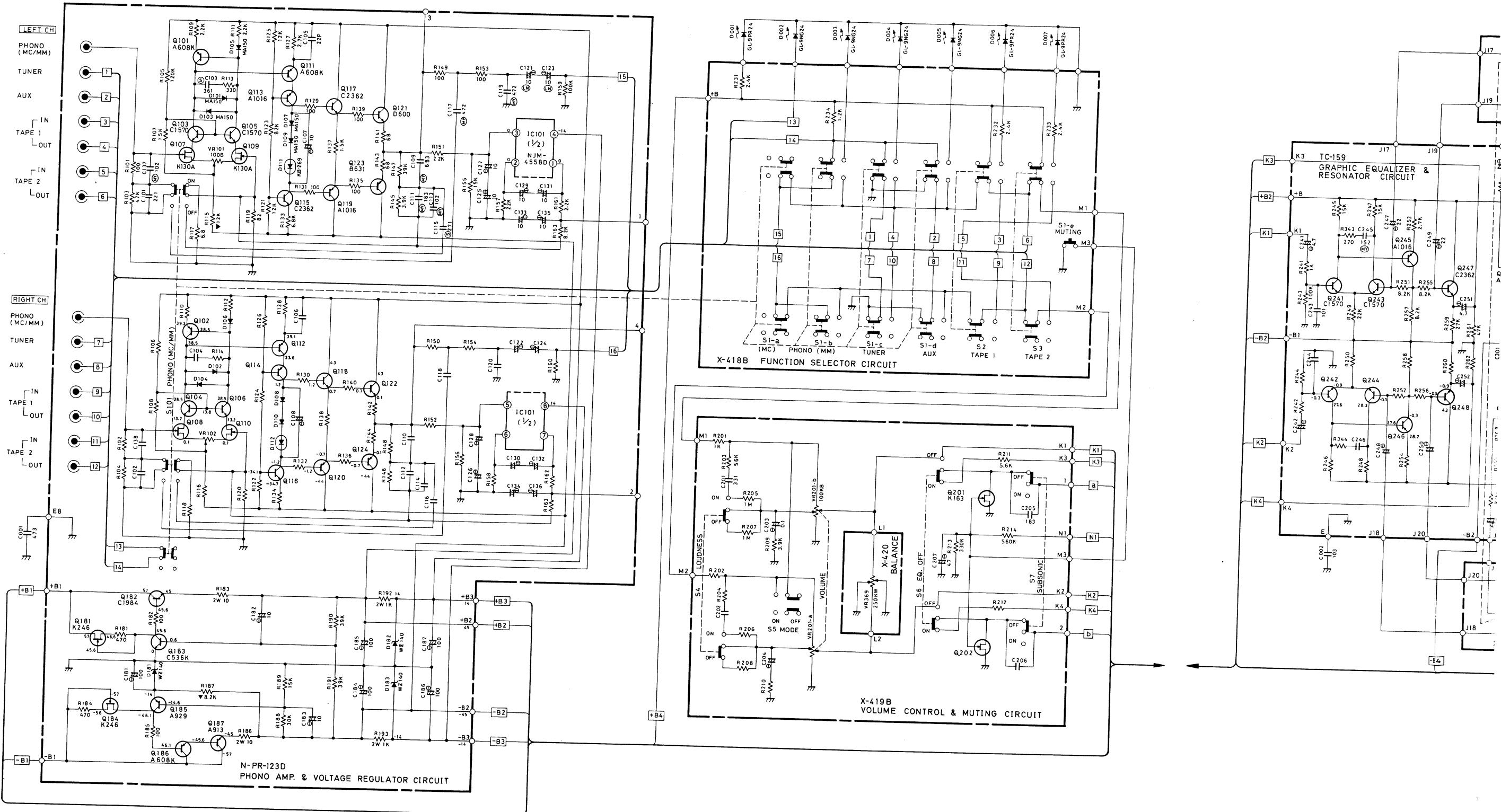
## PREAMPLIFIER AND EQUALIZER CIRCUIT CIRCUIT DE PREAMPLI/D'EGALISEUR



## **MAIN AMP AND POWER SUPPLY CIRCUIT CIRCUIT D'AMPLI PRINCIPAL/D'ALIMENTATION**

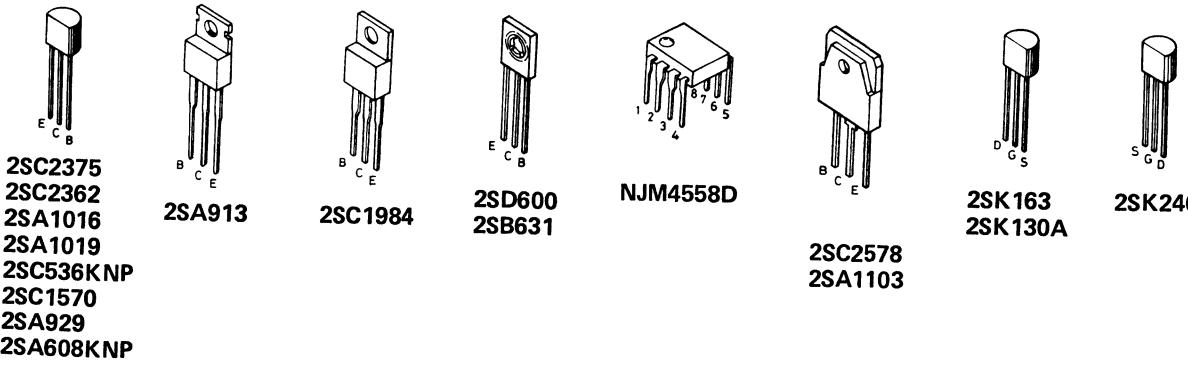


# Schematic Diagram Diagramme schématique



RA-700 (NO.1)

RA-700 (N)



## RESISTORS

Unless otherwise specified, resistors are 1/4 watts, low noise type carbon film type with a tolerance of 5%

K . . . . . Kilohm

M . . . . . Megohm

▼ . . . . . Uninflammable carbon film resistor, 1/2 watts

## CAPACITORS

Unless otherwise specified, all capacitance values are expressed in mfd.

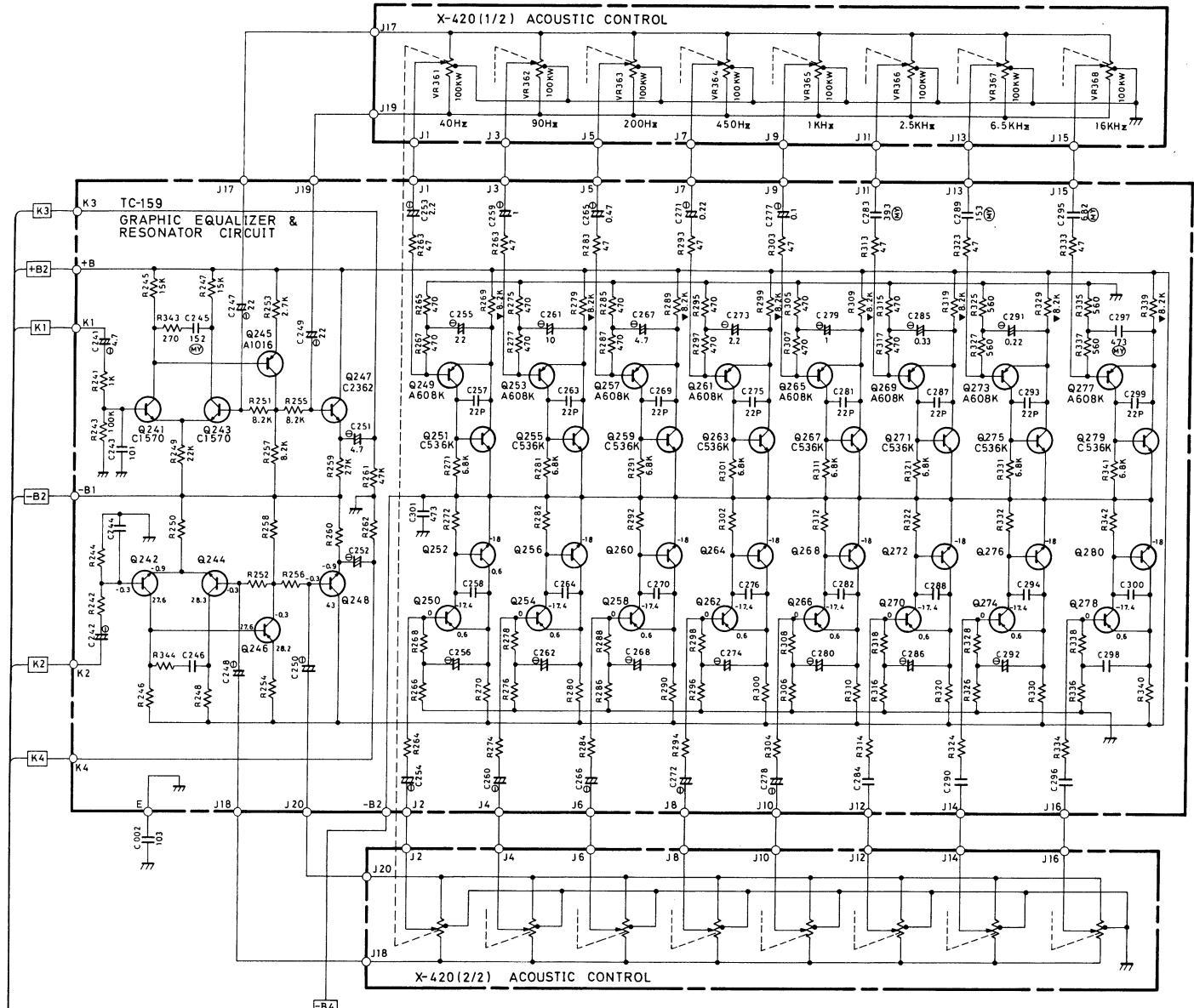
S . . . . . Polystyrene film capacitor

MY . . . . . Mylar film capacitor

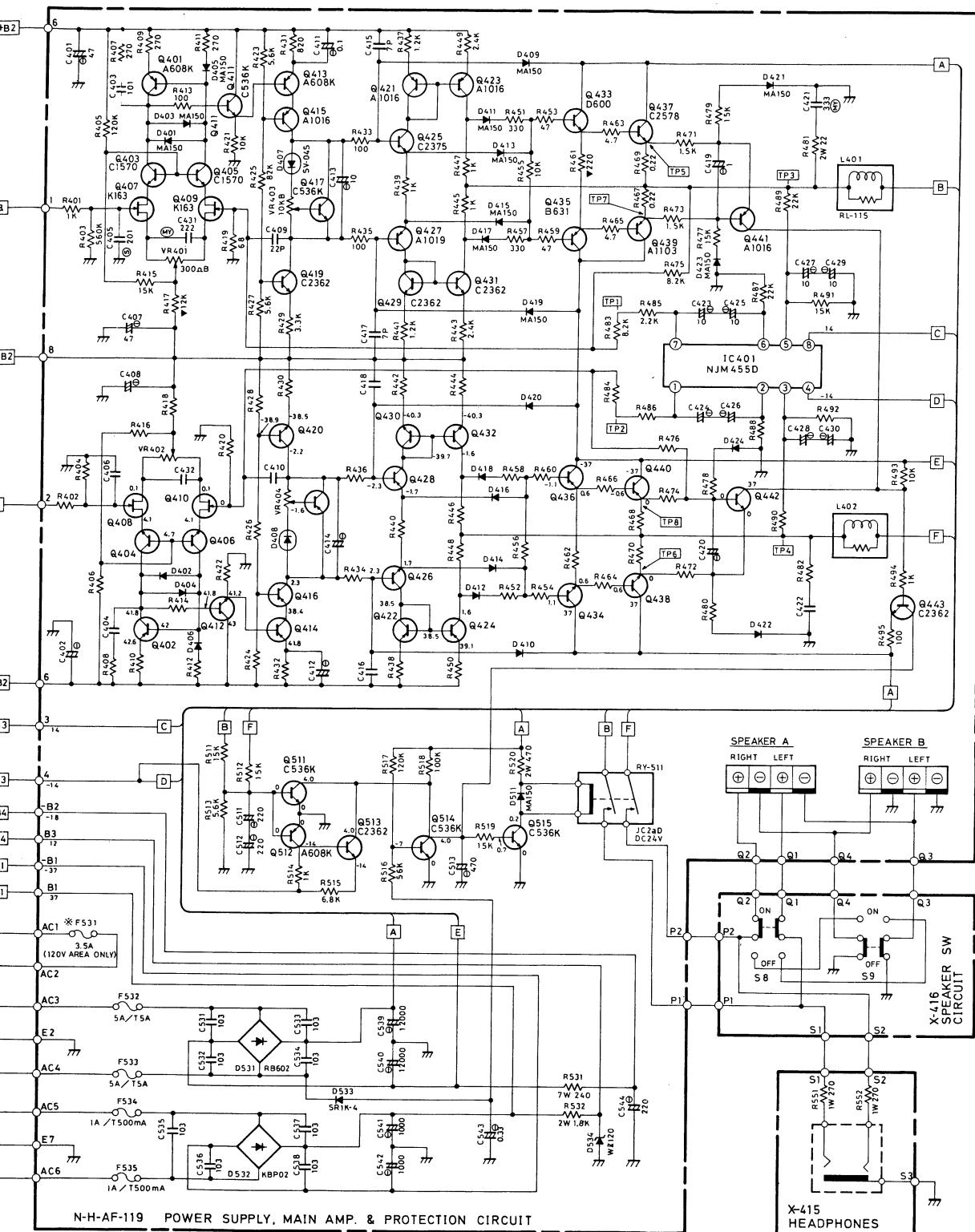
— . . . . . Electrolytic capacitor

Non mark . . . Ceramic capacitor

- Voltage read with VTV across the point shown and the chassis ground (line voltage: 120V)
- Voltage reading tolerance: ±20%



RA-700 (NO.2)



cified, all capacitance values are

styrene film capacitor

film capacitor

electrolytic capacitor

ceramic capacitor

in VTV across the point shown and

(line voltage: 120V)

tolerance: ±20%